DOCUMENT RESUME

ED 479 425 IR 022 102

AUTHOR	Alamaki, Harri; Seppala, Pauliina
TITLE	Experimenting with Mobile Learning in a University Environment.
PUB DATE	2002-10-00
NOTE	9p.; In: E-Learn 2002 World Conference on E-Learning in Corporate, Government, Healthcare, & Higher Education. Proceedings (7th, Montreal, Quebec, Canada, October 15-19, 2002); see IR 022 093.
AVAILABLE FROM	Association for the Advancement of Computing in Education (AACE), P.O. Box 3728, Norfolk, VA 23514. Tel: 757-623-7588; e-mail: info@aace.org; Web site: http://www.aace.org/DL/.
PUB TYPE	Reports - Descriptive (141) -- Speeches/Meeting Papers (150)
EDRS PRICE	EDRS Price MF01 Plus Postage. PC Not Available from EDRS
DESCRIPTORS	Computer Assisted Instruction; Computer Uses in Education; Distance Education; Educational Technology; Foreign Countries; Forestry; Higher Education; Home Economics Education; Learning Activities; *Pilot Projects; Teacher Education; Teaching Methods
IDENTIFIERS	Digital Imagery; Digital Technology; *Wireless Technology

ABSTRACT

This article describes a mobile learning project, where mobile devices are used for educational activities. The article defines the word "mobility" from the educational point of view. The authors present experiences recorded while using mobile technology in teacher training and among students of forest resource. Two pilots were carried out at the Department of Home Economics and Craft Science and the Department of Forest Resource Management of the University of Helsinki. The idea of the pilot in home economics teacher training was that supervising teachers and trainee students should discuss and share their ideas about teaching methods and other topics through mobile devices and also using SMS-messaging and digital pictures as part of the supervision process. The use of digital pictures, which were delivered via the mobile device, was surprisingly successful. The students of forest resources used mobile technology to deliver textual and pictorial material from forests. The goal of these innovative pilot projects is to create flexible teaching solutions that will enable users of all kinds of devices to access information, and to support learning in a variety of ways. (Contains 11 references.) (Author)

Reproductions supplied by EDRS are the best that can be made
from the original document.

Experimenting with Mobile Learning in a University Environment

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

G.H. Marks

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

2B

Mr. Harri Alamäki
Oy Radiolinja Ab
Finland
Harri.Alamaki@radiolinja.fi

Ms. Pauliina Seppälä
Educational Centre for ICT, University of Helsinki
Finland
Pauliina.O.Seppala@helsinki.fi

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ED 479 425

Abstract: This article describes a mobile learning project, where mobile devices are used for educational activities. The article defines the word "mobility" from the educational point of view. We present experiences recorded while using mobile technology in teacher training and among students of forest resource. Two pilots were carried out at the Department of Home Economics and Craft Science and the Department of Forest Resource Management of the University of Helsinki. The idea of the pilot in home economics teacher training was that supervising teachers and trainee students should discuss and share their ideas about teaching methods etc. through mobile devices and also using SMS-messaging and digital pictures as part of the supervising process. The use of digital pictures which were delivered via the mobile device was surprisingly successful. The students of forest resources used mobile technology to deliver textual and pictorial material from forests. The goal of these innovative pilot projects is to create flexible teaching solutions, which will enable users of all kinds of devices to access of information, and to support learning in a variety of situations.

Introduction

According to Clark Quinn (Quinn 2000) "Mobile learning is learning through mobile computational devices". So mobile learning refers to situations in which students use mobile technology in their studies. Characteristic of mobile learning is the opportunity to break away from the teaching that takes place in a classroom, and to move to another location while communicating over information networks. Another distinctive feature of mobile learning is that it enables learners to enter an information network at the precise moment when it is necessary by using a portable learning device and a wireless network. Mobile learning may be considered as an extreme form of flexible learning. The mobile environment integrates studies that take place on campuses, at homes or outside university facilities into one shared, flexible learning environment (Sariola 2001).

The university of Helsinki has had a special interest in trying to benefit from the use of mobile technology in learning and teaching. One of the reasons is that the university itself is changing from a traditional monolithic, integrated unit to one with four different university campus areas, which are physically located in different places. This brings a need for mobility and flexibility. This in turn often means solutions which use mobile technology. At present, Finland has about 5 million inhabitants, over 70% of whom have mobile phones. Approximately 98% of university students have a mobile phone, so we can assume that university students are highly experienced users of mobile technology (Tuononen & Helin 2001).

Since the middle of the 90's several teachers and researches at the University of Helsinki have experimented mobile technology in teaching and studying. The first project was the LIVE –project (Learning in a Virtual Environment) in 1997-1999 (see Nummi et al. 1998, Sariola et a. 2001) The UniWap project was begun in June 2000 as a joint venture between The Educational Centre for ICT in the University of Helsinki and the software company Fujitsu Invia. In this project a WAP-based project environment which utilized a shared database was developed In practice, this meant that if teachers came up with a good idea, they could immediately use a WAP phone to enter the idea in the database. This first Uniwap pilot was tested by 25 university teachers in connection with personnel training in 2001.

IR022102

BEST COPY AVAILABLE

Based on the Uniwap -project the Educational Centre for ICT with its partners, Fujitsu Invia, Oy Radiolinja Ab, The Hypermedia laboratory at the University of Tampere and R5Vision, established "the Mobile Learning -project". The aim of this project is to develop the production of digital learning materials and construct models for teaching, studying and learning in mobile learning environments. The Uniwap environment has been improved, for example, the addition of SMS services and the transfer of digital pictures to the environment. These additions have now been tested in two pilots in the University of Helsinki. The first pilot was carried out on trainee teachers in the Department of Home Economics and Craft Science and the second one on students in the Department of Forest Resource Management. These two educational fields were chosen mainly because of two reasons. First, in both cases there was an instant need to diversify the way in which teaching was organised and to experiment with alternative pedagogical approaches. Second, in both disciplines there were personnel who had participated in the mobile pioneer group for personnel training. Both these groups of teachers were both skilled and eager to try to benefit from mobility in their own fields.

At the end of both projects, there was a group interview in which both the teachers and students participated. One of the researchers took notes during the interviews. It was also taped and transcribed. In the case of the forest students, a questionnaire, based on the issues that emerged in the interview was also completed by the students.

Mobility

We will start by defining the word "mobility" from the educational point of view. Kynäslahti (Kynäslahti 2002) claims that mobility has the following three elements:

1. convenience
2. expediency
3. immediacy

Kynäslahti arrived at these elements by asking the following questions which deal with mobility of teaching and learning.

Who/what is mobile?
Why is that person mobile?
Who is on the move?
Why is that person is on the move?

When we think of the question, who/what is mobile, we can obtain at least four different outcomes: 1) a teacher, 2) a learner, 3) some external specialist, 4) content (learning content, an animal etc.)

When we think of question why someone is mobile or on the move while he is teaching or learning, we can obtain the following answers: 1) The reason for moving is irrelevant to learning and teaching. The person happens to be moving while conducting educational activities. It has to do with convenience, rational time management etc. 2) Secondly the person just are on the move in some particular place or in places which are relevant regarding the subject that is being studied. This would be called the perspective of expediency. 3) The third essential aspect of mobility is immediacy. Users are able to perform an educational act immediately, even if it requires access to the Internet or a connection to other kinds of electronic environments, regardless of where they are. (Kynäslahti et al. 2002)

The word mobility can be defined also from a technical point of view. What devices which can used while we are learning in mobile situations?

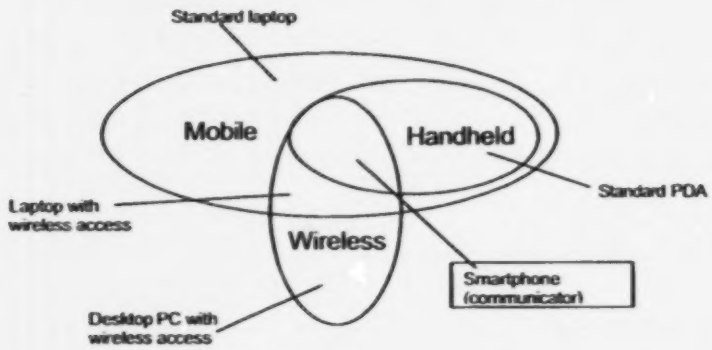

Figure 1: Defining the mobile device (adapted from Siilasmaa 2002).

This figure defines the requirements for the mobile device which was to be used in this pilot project. First of all we can think of its mobile features. The traditional example of a mobile device is a standard laptop computer. It is portable and can be taken to many places. By adding the hand held feature to the mobile feature we can get a standard PDA (personal digital assistant) device. These devices (laptops and PDAs) do not yet offer the capabilities required to carry out tasks which were needed in this project. We also needed wireless access to a network. A wirelessly connected device can also be a desktop computer which is connected to a wireless local area network. By adding the mobile feature to the wireless feature we can obtain a laptop computer with WLAN access. But in this pilot we needed a device which is mobile, hand held and has wireless access to a network.

The device which meets all these requirements is a smartphone (Nokia Communicator 9210). In this project it was also important that the device has a www-browser. The browser enabled the user to upload digital pictures to appropriate locations in the learning materials.

Technical implementation

We set up a mobile learning environment for testing and evaluating purposes. We needed a device which can use existing wireless phone networks and is capable of data transfer and presentation. We also wanted to use a device which has features found both in PDAs and cellular phones. We came up with the Nokia 9210 Communicator because of its full feature keyboard and midsize colour screen. This device can handle common HTML-pages, WAP-pages, email and naturally SMS-messages. All of these techniques were to be used in this project. The learning materials were located in a web-based environment, and it was possible to have multichannel access to this environment. The database was accessible by PC www-browsers, smartphone www-browsers and wap-browsers. We also tested the transfer of digital pictures. We used infrared connections to transfer the pictures from digital cameras to the phone. We had to use quite a barebones user interface version of the phone so we could simultaneously transfer pictures and text material to the server. We could thus operate within the bandwidth limitations of GSM-networks. The figure below illustrates the technical implementation of the pilot project.

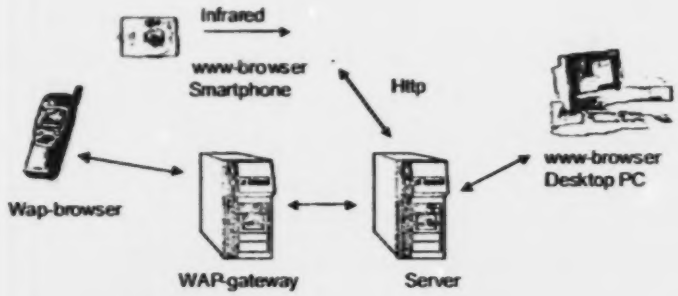

Figure 2. Technical implementation of the pilot project

BEST COPY AVAILABLE

Case: Mobile learning in teacher education at the Department of Home Economics

In spring 2002 we started the Uniwap -pilot for trainee teachers at the Department of Home Economics and Craft Science. There were eleven students and five teachers in this "mobile pilot". The Educational Centre for ICT lent the teachers and students 10 Nokia Communicator 9210s and two digital cameras (Casio QV-3000EX/Ir). We will take a closer look at this case in this section

Teacher education and mobility in teacher training

In Finland, prospective teachers are educated in departments of teacher education or other similar university departments. Successful trainee teachers obtain a Master of Education degree. The course work for the degree requires 160 study credits. One credit is equivalent to 40 hours of study. The teachers' pedagogical studies include educational studies, didactics and teacher training. The purpose of teacher training is to train students to plan and organize their teaching duties. For many students, the teacher training course is their first practical contact with the everyday life of a teacher. Students have the opportunity to use their own knowledge, experiences and personal characteristics and grow into a capable teacher. The development of a professional identity and skills are supported by supervising teacher.

In this case we used the virtual teacher training instruction model (Tuononen & Kurola 2002). This means that the students are instructed in three different ways: 1) face-to-face instruction, 2) instruction via a network based learning environment and 3) instruction via a mobile device. Face-to-face instruction is the traditional method where student and supervisor discuss practice teaching sessions. Network-based-instruction means that supervisor uses a learning management system to interact with the students. The supervisor can deliver training material by various methods including the Internet. The third method is the use of mobile devices for instruction. The main idea of the virtual teacher training instruction model is that the student has the possibility to document all aspects of his/her teacher training. Face-to-face instruction is nowadays more or less the prescriptive way to instruct trainees. The trainee always has the opportunity to ask questions and to go back to the network based or mobile instruction documents for more details. The supervisor can for example use a mobile device to have real time conference calls with his/her students. When this is done the supervisor is able to reach all his/her students even if they are physically in different places. There are many other examples of how a supervisor can support the instruction of trainees using mobile devices.

How the pilot was carried out

The mean aim of pilot was to enable teacher and students to discuss teaching methods, through mobile devices and also to use SMS-messages and digital pictures as a part of the course. The pilot also enabled supervisors to take digital pictures of various teacher training occasions, the learners' throughput and different teaching techniques. The trainees themselves could also make their wishes concerning what pictures the supervisor should take. The pictures could be downloaded from the phone to the camera via an infrared connection. The pictures could then be uploaded using a www-browser to the trainee's material bank in a Uniwap-database even before the training session had finished. Moreover, the supervisor may write down ideas and feedback related to the training session and send them to the trainees. The trainees then put together a digital portfolio on the basis of the photographs and a network discussion.

Case: Mobile learning at the Department of Forest Resource Management

The other case study was made at the Department of Forest Resource Management. Fifteen students and three teachers took part in the pilot. This pilot was part of a course called "The forest planning and inventory project". The participants used the same equipment as the students of home economics. So, the technical infrastructure and other functions were exactly as those used in the home economic pilot. The use context was different, as the users used their mobile devices for different purposes.

Studying at the Department of Forest Resource Management

BEST COPY AVAILABLE

Forest Mensuration and Management is an applied science that relies on informatics, forest economics and biological sciences as applied to forests. This subject helps the student to obtain the knowledge and skills needed for measuring the qualitative and quantitative characteristics of trees, forest stands and any larger forest area. Students majoring in this field learn to apply remote sensing, statistical sampling techniques and GIS to forest inventory and monitoring and they obtain knowledge essential for building and applying models that describe the development and states of forests. The management planning of forests resources with multiple objectives is an important part of this field. The teaching is based on lectures with exercises, field courses, problem-based learning, the literature of the field and seminars. (Student´s Guide 2002)

How the pilot was carried out

The substantial themes of the course were acquisition of spatial data (geoinformatics) and planning methods, especially multi-criteria decision analysis. The stimulated situation for the student groups was to act as advisers for landscape planning for the Viikki campus area. The students were divided into two groups. One group worked in the forests and the other group of students, the analyzing group, were in the classroom . To complete the task, the forest group, needed to walk all over the campus, choose different kinds of scenery, take digital photographs and determine the GPS-coordinates of the corresponding points. After the pictures and metadata had been wirelessly transferred to the database using mobile devices, the analysis phase took place in the computer classroom. GIS-software was utilised in order to place the GPS-points on the map. Furthermore, web-based decision support software was used to complete the scenery comparison.

Results

We looked at the three different elements for mobility (according to Kynäslahti) and compared them to the feedback, which we collected from the students and teachers. The elements were convenience, expediency and immediacy.

First we examined aspects of convenience. The students felt that the reason they were mobile was that they wanted to use their idle moments for educational activities. For example, they, wrote notes or memos to be shared with other students on the bus or train. They uploaded pictures from their phones to the material bank. All of these examples deal with convenience. The university students had the opportunity to use their time rationally even when they were on the move.

The second element is expediency. The students moved between various locations. Trainee teachers worked in a classroom environment and they also conducted activities in many other places while they were on the move. From the expediency point of view teacher trainees pointed out that they had to work at home and they did not have any other access to the Internet apart from their phones. Trainees also mentioned that they used the phones in stores when they had to check if there were particular foodstuff at school which they needed in their trainee home economics lessons. In these cases they mostly used audio calls and SMS-messaging. The trainees wanted to move pictures from the camera to the phone right away and most of the time this was possible in the classroom. They felt that without mobility the working method with the camera would not have been appropriate. The forest management students also had to send pictures and coordinates right away to the analyzing group.

The third element is immediacy. This element was most meaningful for the trainee teaches. They liked the fact that they were able to act immediately. They wrote memos and took pictures while they were observing other trainees' lessons. The trainees had an immediate need to write down their thoughts and ideas to be shared with other trainees. One trainee said that she got a great idea on the way to university very early in the morning and was happy to be able to share this idea with other class members right away. A mobile device is a great tool for giving feedback at the same time as observing other trainees. We found that there was a difference in the way feedback was given between supervisors and trainees. Trainees gave immediate feedback to other trainees while they were observing. They acted spontaneously. The supervisors were more careful and did not give spontaneous feedback, they thought more deeply about what to write. For example they read through their message text before they sent it and corrected any typos that might be present, while the trainees typed the text and send it without checking.

Forest management students thought that from the immediacy point of view the idea that the user could send pictures and coordinates immediately was great. They often had to make long trips to the forests and they had to be able to share information and material with analyzers or with their supervisors in working life. However, some students criticised the way the course was assessed. The main reason for these criticisms was possibly a failure to appreciate the immediacy aspect of mobility. Some of the students remarked sarcastically that the process of transferring pictures from a digital camera to the Communicator and, their counterparts in the computer room took so much time that it would have been easier to walk to the room and transmit the information directly to PC. This can be seen as a severe disadvantage of the project. However, the immediacy aspect was important for the teachers who guided the process and for students as well when they needed instant help.

The teachers' opinions about mobility and the use of mobile devices were also mostly positive. During teacher training supervising teachers need to work long hours and for that reason they felt that the use of mobile devices helped their work a lot. Teachers need to go from one school to another many times during the day, and while they were travelling they were able to connect to the shared database. Also, teachers felt that mobile devices brought more flexibility to their time usage planning.

The massive use of Uniwap was surprising. During these two pilots there were all together 528 SMS-messages or digital pictures in the Uniwap database. The students of home economics were more active than students of forest resource, they sent a total of 388 messages while the students of forest resource sent 144 messages.

The reason for this difference could be the observation that the trainee teachers used the mobile device and Uniwap as a photo gallery of funny pictures which they had taken during classes. The students of forest resource used the Uniwap strictly for their studies.

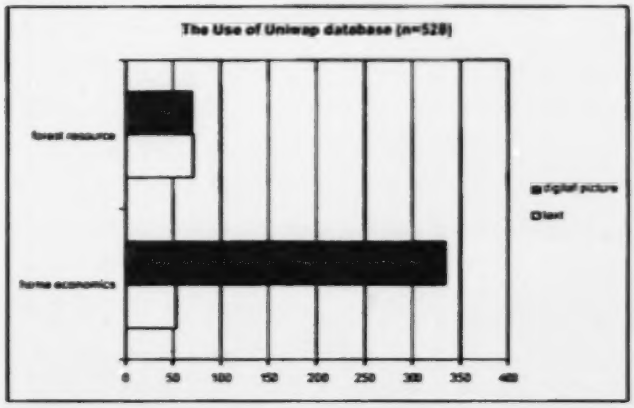

Figure 3. The number of messages and digital pictures in the Uniwap-database.

There were some differences in Uniwap usage times between these two pilots. In the home economics pilot the use of Uniwap was most active at the end of the working week, because most of the trainee lessons were held then. Uniwap was actively used almost round the clock, messages were sent by SMS between 9.39 am and midnight to 12.11 am. The supervising teachers especially sent SMS-messages quite late at night. The main reason for using SMS-messaging was give students feedback after a supervisor had read a trainee student's plan for a lesson. This component of the supervisors' work usually took place at home late in the evening. One supervising teacher said that when she have the possibility to get in touch with her students by using a mobile device and the Uniwap database at any time of the day, it helped her supervising process.

The teachers in the forest resource pilot mainly had the same opinion about freedom to contact students around the clock, but they didn't use that possibility so much. Most messages in this second pilot were sent between 8 am and 6 pm.

When analysing the contents of SMSmessages, we found three kind of situations, in which SMS was used: giving information, supervising and feedback. Mostly SMSmessages were used to send general

information. Teachers sent information about the next class meetings or notified students that their feedbacks or assessments were now available. Also students notified other students and teachers of their plans or GPS coordinates with digital pictures were ready and if they needed feedback.

The most interesting aspect of these pilots was however the number of digital pictures which were taken and uploaded to the Uniwap-database (see Figure 3), especially in the home economics pilot. The reasons for this huge number of digital pictures were that teachers and students found the possibility so much fun that they wanted to take many pictures of every trainee lesson and situation. Because you could upload the picture and notes right away to the database, everybody was able to comment and give feedback instantly. This immediacy, the third element of mobility, was very important and without this "right-away -possibility" the transfer of digital pictures would not have been used so much.

Students thought that the digital pictures helped to grow their professional identity as teachers of home economics. They saw, in so cases for the first time, how they looked in front of an elementary school class and how they taught them. The use of still-pictures helped students and supervisors to see things that they did not notice in the actual situations. This was very helpful in discussions between the students and their supervisors when the students analyzed their own teaching methods and made notes in their portfolios.

Koskinen (Koskinen et al. 2001) points out in their research that digital pictures without text are not interesting. With text you can clarify the situation in picture, why it was important to take or what happened afterwards. In our pilot the text was added to digital pictures during or after they had been uploaded to the Uniwap-database. The students changed the titles of the pictures and wrote little messages describing what was happening in the pictures. Supervising teachers expanded the picture message by giving feedback or asking questions about the situations in the classroom. This way the digital pictures came alive also to people who were not present in the actual teaching situations, such as other trainee students and researchers.

Conclusion

The project brought together Finnish mobile learning innovators in a networked organization. On the national level it made a great contribution to the development and research into mobility in educational use. Both mobile pilots, i.e., at the Department of Home Economics and Craft Science and ate Department of Forest Resource Management showed that the educational use of mobile device and pedagogical opportunities of mobile learning are worth further research and testing. The Educational Centre for ICT continues to use education and testing pilots to spread these innovative methods to other units at the University of Helsinki and possibly to the Finnish Virtual University. The long-term goal is to create flexible teaching solutions, which will enable access to information with all kinds of devices, and to produce materials flexibly in a variety of situations.

Mobile technology is only beginning to take its first steps in academic teaching and studying. The opportunities it creates have been recognised and the idea of a wireless campus is spreading to universities. The integration of the Internet and mobile solutions will transform the use of ICT in teaching and take it in the direction of open teaching, provided that mobile technology is seen as a candidate for the development of academic teaching and education. The core characteristic of mobile learning is that it enables learners to be in the right place at the right time, that is, to be where they are able to experience the authentic joy of learning.

The mission of Radiolinja is to create and facilitate a wireless lifestyle – a Mobile Society. The role of the Technology Center of Radiolinja is to participate in innovative research and development projects. The main aim of those projects is to explore future wireless lifestyles. Radiolinja sees the support of learning and teaching with mobile devices as one of its future possibilities. By taking part in, and supporting these innovative research studies Radiolinja can be certain that it is also promoting the direction that wireless lifestyles will take in the future.

References

Quinn, C. (2000). mLearning: Mobile, Wireless and In-Your-Pocket Learning. Line Zine Magazine. http://www.linezine.com/2.1/features/cqmmwiyp.htm

Sariola, J. (2001). What are the limits of academic teaching? - In search of the opportunities of mobile learning. In Telelearning 2001, 10.-13.11.2001, Vancouver. Canada.

Tuononen, K. & Helin, E. (2001). Research raport of using information technology and mobile phones among students in Department of Pharmatology. (not published)

Nummi, T., Rönkä, A. & Sariola, J. (1998). Virtuality and Digital Nomadism: An Introduction to the LIVE Project (1997-2000). University of Helsinki. Department of Teacher Education. Media Education Centre. Media Education Publications 6.

Sariola, J., Rönkä, A., Tella, S. & Kynäslahti, H. (2001). From Weak Signals to the Concept of mLearning: The LIVE Project Revisited. In Loveless, A. & Dore, B. (Eds.) ICT in the Primary School: Changes and Challenges. Miltoin Keynes: Open University Press. (In press)

Kynäslahti, H. (2002). Mobiilisuus liikkumisena – Helsingin yliopisto liikkeessä. (*Mobility as moving –The University of Helsinki on move.*) In publication Seppälä, P. (ed.) 2002. Mobile learning – Flexibility in moving. (in Finnish) Helsinki: University of Helsinki. The Educational Centre for ICT.

Kynäslahti, H., Sariola, J. Tuononen, K., Seppälä, P. & Hujala, T. (2002). The UniWap Experimenting with mobile teaching and studying. Paper in EERA-conference. The Educational Centre for ICT University of Helsinki

Siilasmaa, R. (2002). Securing the Mobile Enterprise. Presentation in TecIT Forum 23.2.2002. Helsinki.

Tuononen, K. & Kurola, J. (2002). Verkko-ohjaus ja mobiilisuus korkea-asteen opiskelussa (*Net-mentoring and Mobility in Higher Education*). In publication Seppälä, P. (ed.) 2002. Mobile learning – Flexibility in moving. (in Finnish) Helsinki: University of Helsinki. The Educational Centre for ICT.

Student's Guide. (2002). Faculty of Agriculture and Forestry 2002-2003.
http://honeybee.helsinki.fi/mmvar/ENGLISH/formensandman/index.htm

Koskinen, I., Kurvinen, E. & Lehtonen, T.-K. (2001). Mobile Image. Edita. IT Press. Helsinki.

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

NOTICE

Reproduction Basis

[X] This document is covered by a signed "Reproduction Release (Blanket)" form (on file within the ERIC system), encompassing all or classes of documents from its source organization and, therefore, does not require a "Specific Document" Release form.

[ ] This document is Federally-funded, or carries its own permission to reproduce, or is otherwise in the public domain and, therefore, may be reproduced by ERIC without a signed Reproduction Release form (either "Specific Document" or "Blanket").